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Start-Up Incubators

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An analysis of two leading incubators and their performance

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An analysis of two leading US incubators and their performance

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Accelerators are a modern phenomenon of start-up support. The first accelerator was founded in 2005 and several hundred have been created all over the world since then. The concept of acceleration itself is not new but the recent programs take a different approach. How well do these perform and what is the best method to accelerate start-ups? Two leading accelerators YC and Techstars are being analysed in this paper to evaluate their differences in performance and their approaches.

Keywords: Start-Up Accelerators, Entrepreneurial Finance, Start-ups, Performance, Y Combinator, Techstars

1. Introduction

Innovation is a necessity to develop and maintain economic growth. Throughout the decades of economic development, the forms and means of innovation have drastically changed to today's nexus in which start-ups play a vital role in the innovation process. Developing a new business idea and thus creating a new venture comes with a large amount of uncertainty. A report by Marmer et al., 2011 mention that more than 90% of start-ups fail, primarily due to self-destruction rather than competition. It is also mentioned that the remaining 10% did encounter several near failure experiences along the way. This percentage is also mentioned in several blog posts and news articles, while one suggests the value is not correct stating an analysis of Cambridge Associates tracking the return of 27.259 start-up investments between 1990 and 2010 showing that the real percentage of failure (return of 1X or less) has not risen above 60% since 2001 (Griffith, 2017).

Throughout the years an ecosystem of support developed around founders and their start-ups. This includes academic research studying reasons for failure, collaboration efforts and network creation through start-up hubs, governmental actions to create a more favourable framework for entrepreneurs and many more initiatives on local and international levels. However, the concepts of these initiatives and motivation for start-ups to join vary largely. Thus, this paper will focus on the concept of accelerator programs.

The first accelerator program, Y Combinator (YC), started in 2005 in Cambridge and comprehends many concepts of the already existing business incubator. With the increasing focus on IT-based start-ups and products, YCs founders decided to develop a program with a much shorter cycle, being 3 months, as the development of IT products varies from traditional business and is usually shorter. The purpose of start-up accelerator programs is to support early-stage ventures with the necessary knowledge, experience and network to accelerate the

company's development and growth. This is done through education, mentorship and financing within a set time period and as part of a "class" consisting of a group of start-ups. Table 1 provides an overview of common institutions that support start-ups and compares their key characteristics.

Table 1: Institutions that support Start-Ups

	Incubators	**Angel Investors**	**Accelerators**	**Hybrid**
Duration	1 to 5 years	Ongoing	3 to 6 months	3 months to 2 years
Cohorts	No	No	Yes	No
Business model	Rent, nonprofit	Investment	Investment, can be nonprofit	Investment, can be nonprofit
Selection	Noncompetitive	Competitive, ongoing	Competitive, cyclical	Competitive, ongoing
Venture stage	Early or late	Early	Early	Early
Education	Ad hoc, human resources, legal	None	Seminars	Various
Mentorship	Minimal, tactical	As needed, by investor	Intense, by self and others	Staff expert support, some mentoring
Venture Location	On-site	Off-site	On-site	On-site

Source: Harvard Business Review, "What do Accelerators do? Insights from Incubators and Angels", Ian Hathaway, 2016

The number of accelerator programs increased greatly after 2008, as did the number start-ups, early-stage capital and venture investments more broadly. Overall, the number of US accelerator programs increased by an average of 50% each year between 2008 and 2014, leading to a total number of 172 US-based accelerators in 2014. (Hathaway, 2016)

Overall, the accelerator concept is a more recent phenomenon which is not yet fully studied by academics. Thus, the purpose of this paper is to complement the existing literature with analysing and comparing the performance of two leading accelerator programs in the US and providing an explanation of possible differences. The motivation to study accelerators comes

from an interest into the start-up nexus and out of curiosity for accelerator programs and start-ups reasons for participation.

The programs chosen are YC and Techstars. YC is the first incubator founded in 2005 by Paul Graham, Jessica Livingston, Trevor Blackwell and Robert Tappan Morris. Its located in Silicon Valley and the most recent YC class consisted of 132 companies. Techstars is an accelerator program founded in 2006 by David Cohen, David Brown, Brad Feld and Jared Polis. It hosted its first program in the summer of 2007 and since then established accelerators all over the world with 43 different programs listed on their website. Appendix 2 and 3 provide a more detailed overview of both programs.

To evaluate the performance of the two accelerator programmes this paper will analyse several key metrics regarding performance, geographical distribution and consistency. In order to provide a detailed overview of the subject, the paper will first provide a more detailed description of the accelerator and start-up nexus linking existing literature to the research topic. Second, the dataset will be introduced, and the most relevant metrics will be presented. Third, a summary of the results extracted from the dataset is provided, directly comparing both accelerator programs. In the end, the paper will focus on the reasons in differences between the two programs and point out potential advantages.

2. Literature Review

The literature available on start-up accelerators is limited for several reasons. First, the topic itself is recent leaving only a short time period for academics to have studied the subject. Second, the area of accelerators is very specific and part of the overall field of entrepreneurship and innovation that covers a large variety of sub-topics of which a lot are not exhaustively researched. Third, due to the set-up of accelerators, which are mostly privately held and operated, information access and availability is limited making research more complicated. This

lack in peer-reviewed academic research leads to a reliance on secondary sources being media sources, reports, interviews or blog posts to complement existing academic sources and is a large part of the papers published on this topic.

As the concept of accelerators is still recent academics are still adding to the definition of the accelerator. Miller and Bound (2011) describes distinctive features that set accelerator programs apart from existing incubators and other programmes to support start-ups. The authors define accelerators with the following characteristics:

- *An application process that is open yet highly competitive.*
- *Provision of pre-seed investment, usually in exchange for equity.*
- *A focus on small teams, not individuals.*
- *Time-limited support comprising programmed events and intensive mentoring.*
- *Start-ups supported in cohort batches or 'classes'.*

Cohen and Hochberg (2014) provide the following definition:

A fixed-term, cohort-based program, including mentorship and educational components, that culminates in a public pitch event or demo-day.

Thus, adding the aspect of a graduation event in the form of a pitch or demo-day. Additionally, programs may be for-profit or non-profit and can vary in their duration, equity stake taken, length of the mentorship and educational program, availability of coworking space and in industry vertical focus (Cohen and Hochberg, 2014).

Accelerators have similar characteristics to incubators. However, the accelerator concept represents a shift towards intangible, knowledge-intensive support services in incubation services (Pauwels et. al, 2016). In their study, Pauwels et al (2016) delineate the accelerator model as a new generation of incubation model and identifies differences in five key aspects

(program package, strategic focus, selection process, funding structure and alumni relations). Table 2 summarizes the key design elements identified in their study.

Table 2: Summary of Design Elements and Constructs as described by Pauwels et al.

Program Package	Strategic Focus	Selection Process	Funding Structure	Alumni Relations
Mentoring Services	Industry / sector focus	Online open call	Investor funding	Alumni network
Curriculum / training program	Geographical focus	Use of externals for screening	Corporate funding	Past Program support
Counselling services		Team as primary selection criterion	Public funding	
Demo days			Alternative revenues	
Location services				
Investment opportunities				

Source: Pauwels et al. (2016)

The advantages of participating in an accelerator program are vast. Miller and Bond (2011) identified six key benefits through a series of interviews which are *(1) Funding* – the money received is valuable. However, it was rarely rated as a most important consideration. *(2) Business and product advice* – accelerators have a network of experts in different fields providing feedback and advice on the start-up's product and company. *(3) Connections to future investment* – because accelerators provide a quality pipeline of new companies, investors are sure to attend events and inform themselves about participating start-ups. *(4) Validation* – being accepted into a prestigious accelerator program signals future investors. *(5) A peer support group* – being in a cohort of start-ups allowed participants to connect and provide meaningful support. This is also represented in the powerful alumni network. *(6) Pressure and discipline* – establishing a functional system and work ethic can be hard at the beginning. Accelerators have a rigorous program establishing the necessary discipline. Furthermore, Miller and Bound (2011) evaluate the benefits for stakeholders other than the direct participants and summarizes

that angel investors, VC firms, large technology firms, other start-up founders and service providers also benefit from accelerator programs. Some of these benefits are a reduction in the need for due diligence, an improved deal pipeline, talent scouting and networking opportunities.

Gonzales-Uribe and Leatherbee (2016) take a more quantitative approach at explaining the effect of accelerator programs and the importance of entrepreneurial capital on new venture performance. The study performed evaluates an ecosystem accelerator based in Chile that provides seed capital, co-working space and additional entrepreneurship-schooling to selected participants. By comparing start-ups that were accepted into the Start-Up Chile program to those not accepted, the paper finds that the additional schooling leads to a significant increase in venture fundraising and scale. Additionally, there is no evidence that the basic services improve venture performance. This points out the importance of the accelerator characteristics mentioned before, being those that add value to the program. (Gonzales-Uribe and Leatherbee, 2016)

An analysis by Hallen, Bingham and Cohen (2014) focuses on the impact of accelerator programs on the completion of important milestones. The milestones focused on are time to raising an initial round of venture capital and time to reach a certain level of customer fraction. The authors find that ventures participating in Techstars or YC raise their first financing round faster than start-ups that did not participate in an accelerator program. Additionally, it was found that participating in one incubator results in a slower fundraising. Overall the results suggest that some accelerators support venture development. The level of acceleration can differ, and some accelerators do not achieve a positive acceleration at all. (Hallen et al., 2014)

Overall, several studies have focused on the definition of accelerators and their key characteristics as well as benefits for start-ups and other stakeholders. Furthermore, two papers taking a quantitative approach identified some level of positive acceleration. This acceleration

may be limited to the top accelerators as Hallen et al. (2014) describe. As mentioned before, there is a lack in literature identifying the impact of accelerators. Future research should focus on long-term effects of accelerator participation and identify which characteristics contributed to a possible increase in success. This paper contributes to the literature by comparing the two top accelerator programs and evaluating differences in their structure and the performance of participating start-ups.

3. Methodology

In order to analyse the different accelerator programs, with respect to their performance and other factors, data on the participating start-ups in each program was gathered. The accelerators chosen, YC and Techstars are both leading programs and highly competitive. Both programs publicise the participating companies each year on their respective websites. In total, YC had 1.633 participating start-ups since 2005 and Techstars 1.390 start-ups since 2007. All start-ups were considered for the purpose of this analysis.

Due to the characteristics of start-ups, being a short time period of existence and limited to no public data accessible, there is no established database available providing a full dataset. In order to mitigate this issue, the platform Crunchbase was chosen as the most suitable source for reliable data. Crunchbase is a platform that is based on data collection leveraging a strong community of contributors, a large venture partner network and in-house data teams. The platform contains a large dataset of start-ups, enterprises, investors and people. For this research, the focus lies with the start-ups on which Crunchbase provides general information such as location, founding date and number of employees. Furthermore, the platform provides information on funding rounds and investors, team members, competitors any many more areas. The following variables were chosen in order to evaluate the accelerator programs:

Country, Region and Sub-Region: The location was chosen in order to evaluate the geographical distribution of participating companies and funding.

Status: The status can be acquired, closed, IPO or operating and is used to analyse the success rate of start-ups in each accelerator.

Total funding in USD: The total funding amount captures the funding received since the founding of the start-up.

Number of investors and funding rounds: Number of investors describes the number of different investors that invested in all funding rounds. Funding rounds provides the count of rounds that were complete to raise the total funding.

Crunchbase rank: The Crunchbase rank is a measure developed by Crunchbase. It uses an intelligent algorithm to evaluate and rank entities. The algorithm takes different aspects into account, such as total funding amount, relationship with other entities and number of views. The score shows where the entity falls within the Crunchbase ecosystem relative to all other entities with the same type. A score of 1 is the highest possible rank. This variable was chosen as an additional measure of success for the analysis.

The mentioned variables were extracted using the Crunchbase data access granted for this research project. The data was available partly through direct excel export or the usage of the API access. Appendix 1 shows the Python code used to access and handle the API data. The full dataset retrieved from Crunchbase with additional variables can be requested from the author. Of the 1.633 participating companies in the YC program, 1.580 were identified within the Crunchbase platform. For the Techstars program, 1.323 out of 1.390 start-ups could be identified. The remaining 120 entities could not be matched due to possible failure, name changes, acquisitions or other factors and were not considered in the further analysis.

In order to further compare the accelerator programs to start-ups that did not participate in the YC or Techstars program, a secondary dataset of 707.250 organizations was extracted. As the platform Crunchbase does not classify an organization as a start-up this dataset was filtered for organizations with a founding date less than 15 years ago and for organizations that have at least 1 funding round leading to a dataset of 90.676 companies.

The data chosen faces certain limitations. Due to the design of Crunchbase as a platform of collaborative data collection, there can be missing or faulty data entries. Furthermore, the scope of the analysis is limited to two accelerator programs based in the United States. Potentially, this selection does not represent accelerators in other geographical areas. Lastly, it has to be noted that the variables chosen as a measurement of success do not fully capture all relevant parameters that influence the development of a start-up and does not capture all characteristics of an incubator program.

4. Results

The dataset considered for this analysis contains a total of 2.903 start-ups. 1.323 participated in the Techstars accelerator while 1.580 companies participated in the YC program. The following section will analyse the data set in respect to different aspects. In order to provide a comprehensive comparison between both accelerator programs, this section will first analyse the operation status followed by funding amounts, funding rounds and number of investors. Furthermore, the Crunchbase rank and finally the geographical distribution will be considered. Afterwards, the dataset of YC and Techstars companies will be compared to the second dataset of start-ups in general.

Operating Status

The status of a start-up is separated into four categories: operating, closed, acquired, IPO. Table 3 shows the separation of those ventures across the different categories. In total there is only a

small percentage of 7,51% of start-ups that failed. In comparison to that 81,36% are still operating, 11,02% were acquired and 0,10% performed an IPO. This overall success rate of start-ups participating in either accelerator program is higher than expected. As mentioned in a previous section around 60% of start-ups will fail while the failure rate in this sample is below 10%.

Table 3: Overview of Start-Up Status

	No. Of Start-Ups	**Operating**		**Closed**		**Acquired**		**IPO**	
		#	*in %*	*#*	*in %*	*#*	*in %*	*#*	*in %*
TechStars	1.323	1.119	84,58%	71	5,37%	132	9,98%	1	0,08%
YC	1.580	1.243	78,67%	147	9,30%	188	11,90%	2	0,13%
Total	2.903	2.362	81,36%	218	7,51%	320	11,02%	3	0,10%

Source: Crunchbase Data, own calculations

Comparing the two accelerator programs shows that Techstars has a higher percentage of start-ups still operating while YC has a higher percentage of start-ups being acquired or performing an IPO. Overall, while it is plausible that start-ups participating in an accelerator program have higher percentage succeeding it seems rather improbable that this success rate would be higher than 90%. This result might be due to a bias which leads to the failed start-ups not updating their respective information. In order to mitigate this bias more information was gathered from their respective websites resulting in a failure rate of 13,96% for Techstars and 12,33% for YC[1]. These values are higher than calculated before, however, both values are still significantly below the 60% mentioned by Griffith (2017).

Funding, Funding Rounds and Number of Investors

Funding, funding rounds and number of investors are key variables for describing a start-ups success as they indicate how many parties are interested and convinced by a product and how

[1] The YC operating status was retrieved from https://yclist.com/ not representing official data from Y Combinator. The data available showed 158 failed companies out of 1281 companies in total.

much money these parties are willing to commit. Table 4a provides an overview of several key variables covered in the dataset.

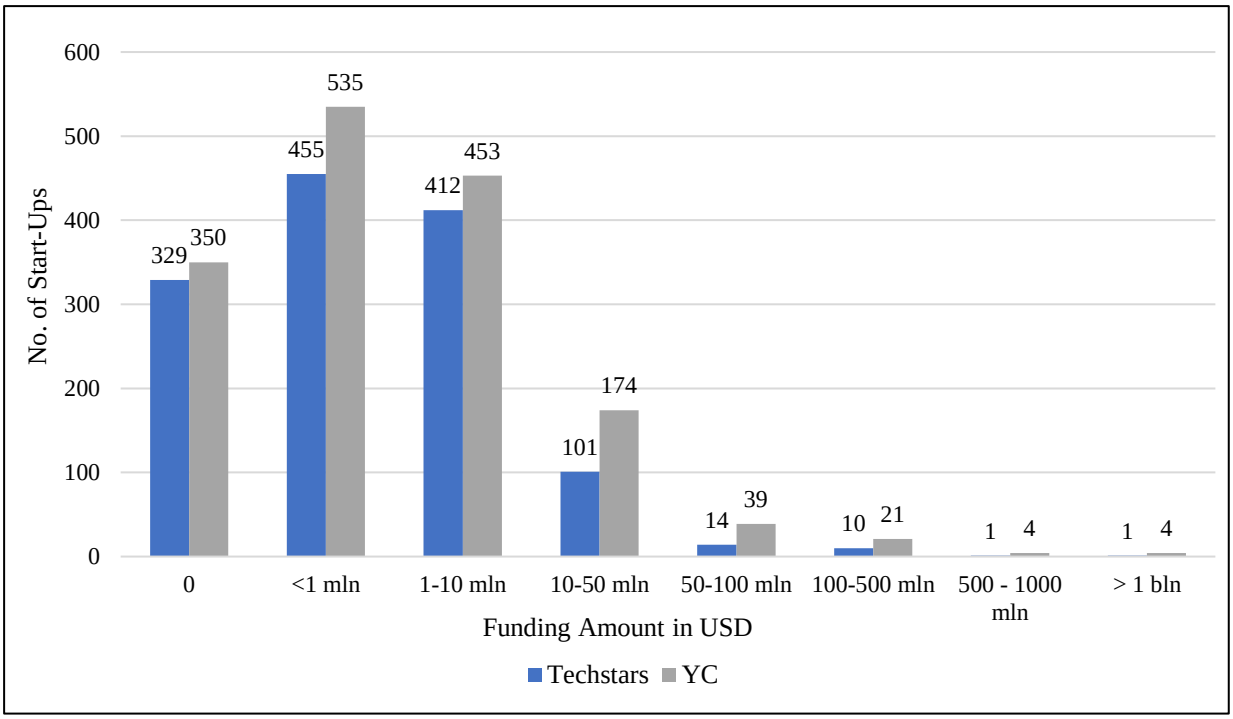
Table 4a: Overview of Performance Variables

	Complete Dataset		
	TechStars	***YC***	***Total***
Count	1.323	1.580	2.903
Total Funding in '000s USD	8.007.132	26.139.536	34.146.668
Average Funding in '000s USD	6.052	16.544	11.763
StdDev of Total Funding	42.812.017	157.626.261	119.921.593
Average No. Investors	5,76	6,43	6,13
StdDev No. Investors	5,12	7,29	6,40
Average No. Funding Rounds	2,66	2,25	2,43
StdDev Funding Rounds	1,90	1,69	1,80

Source: Crunchbase Data, own calculations

Looking at the total funding in Table 4a it can be seen that YC has a significantly higher funding amount compared to Techstars, USD 26,14 billion compared to USD 8 billion. This large difference might be due to the longer time period YC has been operating in. However, when looking at the average funding YC companies still achieve around 250% more funding than Techstars companies. Both, the total funding and average funding are subject to large standard deviations pointing out the extreme differences between start-ups. Interestingly, the average number of investors is only slightly larger for YC companies (YC: 6,43, Techstars: 5,76). To evaluate the large standard deviation Graph 1 shows the distribution of the funding amount for the individual start-up's participating in each accelerator program.

Graph 1: Distribution of Funding in USD



Source: Crunchbase Data, own calculations, no data for available for 67 Techstars and 53 YC companies

Graph 1 shows that the higher total funding amount and the standard deviation is partially due to the higher number of companies being funded with more than 1 billion. USD. The 4 start-ups in the YC program and their respective funding amounts are Airbnb (USD 4,4 billion), Cruise Automation (USD 3,4 billion), Dropbox (USD 1,7 billion) and Instacart (USD 1,6 billion). The highly funded start-up participating in Techstars is WAVE (USD 1,3 billion). Such highly funded companies can be considered exceptions and only represent a small fraction of the overall dataset while significantly influencing the results. Therefore, Table 4b shows an adjusted overview of the performance variables.

Table 4b: Overview of Performance Variables, adjusted

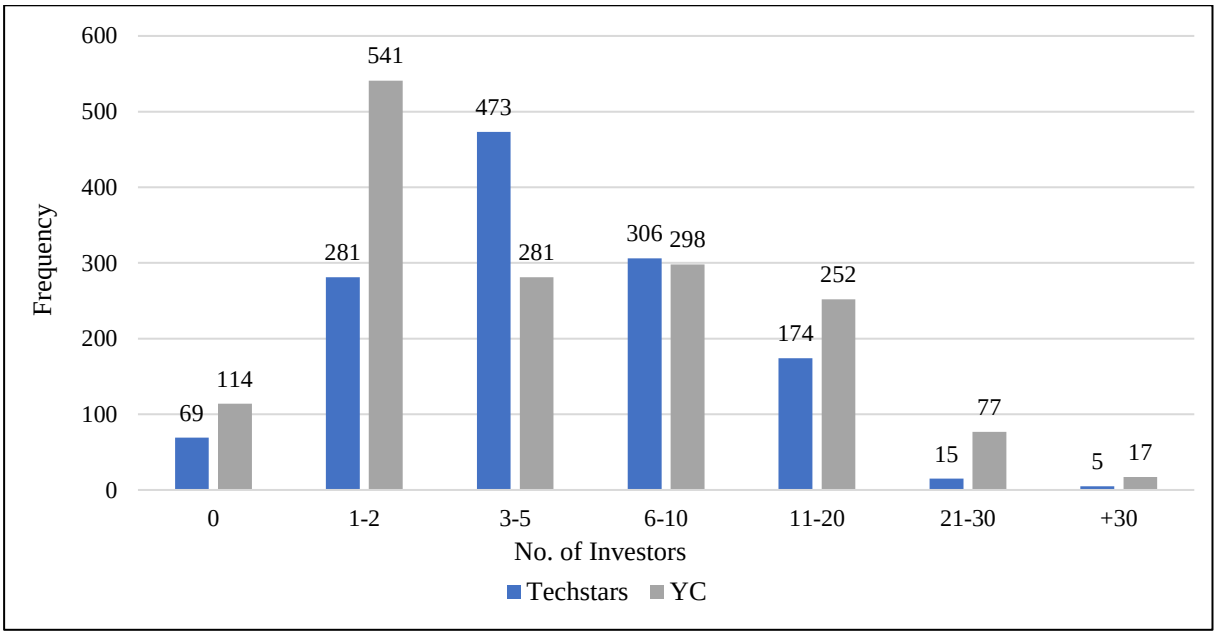
	excluding funding of +1billion		
	TechStars	***YC***	***Total***
Count	1.322	1.576	2.898
Total Funding in '000s USD	6.702.132	15.040.639	21.742.771
Average Funding in '000s USD	5.070	9.544	7.503
StdDev of Total Funding	23.580.214	45.595.238	37.265.936
Average No. Investors	5,76	6,35	6,08
StdDev No. Investors	5,12	7,10	6,28
Average No. Funding Rounds	2,66	2,23	2,42
StdDev Funding Rounds	1,90	1,65	1,78

Source: Crunchbase Data, own calculations

Excluding these companies from the calculations leads to an adjusted overall funding of YC of USD 15 billion and USD 6,7 billion for Techstars with an average funding of USD 9,5 million for YC companies and USD 5,0 million for Techstars companies. While the standard deviation of the total funding amount dropped for both accelerator programs it still points out the extreme differences between start-ups. The adjusted figures confirm the previous outcome being that YC companies on average receive a higher amount of funding.

Looking at the average number of investors of 5,76 for Techstars and 6,43 for YC companies confirms the previous findings. Analyzing the distribution of the number of investors in Graph 2 shows that the majority of Techstars companies have around 3 to 10 investors while YC companies have a larger range in their number of investors, being represented by a larger standard deviation. The overall average for YC is skewed due to the large number of investors in the 4 highly funded start-ups and slightly drops to 6,35 in Table 4b.

Graph 2: Distribution of Number of Investors



Source: Crunchbase, own calculations

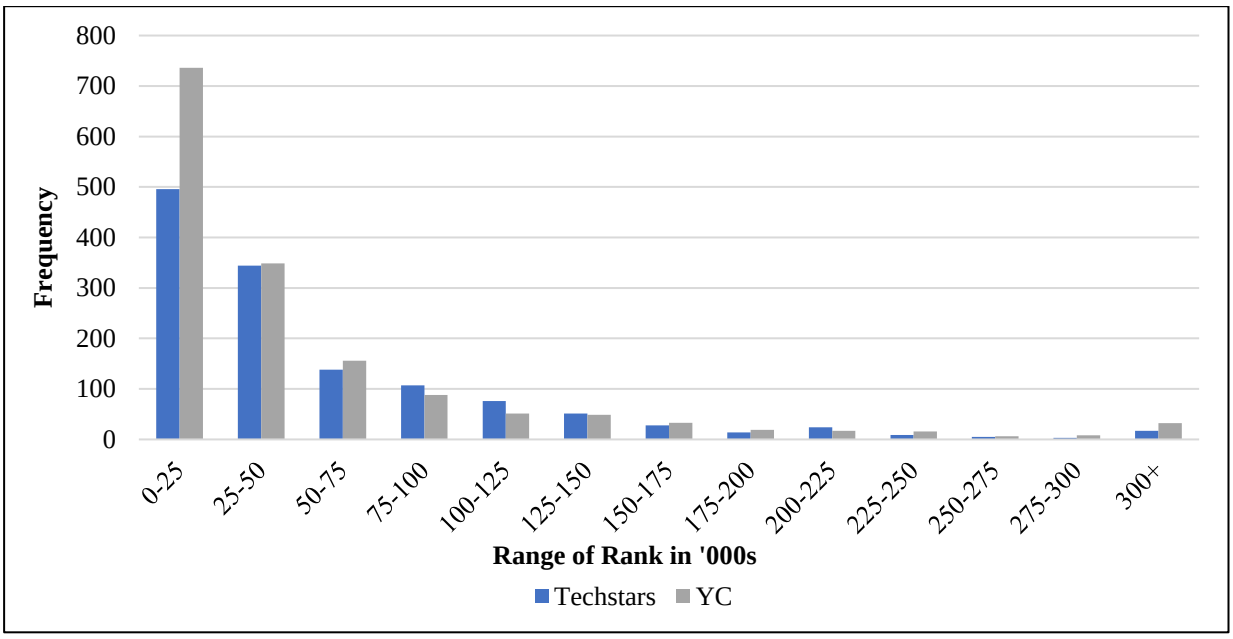
Lastly, considering the number of funding rounds Table 4a shows that on average YC companies have 2,66 funding rounds while Techstars companies have 2,25 rounds.

With the significantly larger average investment volume, a slightly large average number of investors and a larger average number of funding rounds it can be said that investors invest more when investing in YC companies compared to Techstars companies.

Crunchbase Rank

The Crunchbase rank is a measure of success that includes several factors. Overall the average rank for Techstars companies is 57.386 while the average rank for YC companies is 53.902. Graph 3 shows the distribution of the Crunchbase score and it can be seen that a large portion of the start-ups in both accelerators scores below 25.000, which can be considered a good score. However, there are several outliers scoring above 200.000 leading to the average value. Overall this result is in line with the previous findings in the field of investment volume and investor numbers.

Graph 3: Distribution of Rank



Source: Crunchbase, own calculations

Geographical Distribution

Another interesting aspect to consider is the geographical distribution of start-ups participating and the investment volume in each accelerator program. For this analysis, the dataset was divided into 14 regions. YC had participants from 48 different countries while Techstars had participants from 44 different nations. Table 5 shows a complete overview of the number of start-ups and total funding in each of the regions for both accelerator programs.

Overall 78,75% of start-ups in the dataset are from Northern America. YC has an 82,47% share of participants from Northern America while Techstars has a slightly lower share of 74,30 %. For YC the next largest origins are Northern Europe (3,61%), Southern Asia (2,15%) and Latin America / Caribbean (1,39%). Techstars has a slightly different distribution with the second largest origin being Northern Europe (9,75%) followed by Western Europe (5,82%) and Western Asia (1,81%).

Table 5: Geographical Distribution of Start-Up Funding

	Overall				TechStars				YC			
	No. Of Start-Ups	*in % of total*	*Total Funding in '000s*	*in % of total*	*No. Of Start-Ups*	*in % of total*	*Total Funding in '000s*	*in % of total*	*No. Of Start-Ups*	*in % of total*	*Total Funding in '000s*	*in % of total*
Australia and New Zealand	18	0,62%	38.371	0,11%	11	0,83%	4.917	0,06%	7	0,44%	33.454	0,13%
Eastern Asia	17	0,59%	132.030	0,39%	3	0,23%	760	0,01%	14	0,89%	131.270	0,50%
Eastern Europe	10	0,34%	13.177	0,04%	7	0,53%	6.040	0,08%	3	0,19%	7.137	0,03%
Latin America / Caribbean	26	0,90%	417.130	1,22%	4	0,30%	5.821	0,07%	22	1,39%	411.309	1,57%
Northern Africa	4	0,14%	5.780	0,02%	0	0,00%	0	0,00%	4	0,25%	5.780	0,02%
Northern America	2.286	78,75%	32.040.253	93,83%	983	74,30%	7.217.365	90,14%	1.303	82,47%	24.822.887	94,96%
Northern Europe	186	6,41%	515.089	1,51%	129	9,75%	366.137	4,57%	57	3,61%	148.953	0,57%
South-eastern Asia	16	0,55%	256.867	0,75%	4	0,30%	201.420	2,52%	12	0,76%	55.447	0,21%
Southern Asia	40	1,38%	284.794	0,83%	6	0,45%	18.800	0,23%	34	2,15%	265.994	1,02%
Southern Europe	17	0,59%	39.500	0,12%	14	1,06%	8.200	0,10%	3	0,19%	31.300	0,12%
Sub-Saharan Africa	31	1,07%	45.360	0,13%	15	1,13%	4.725	0,06%	16	1,01%	40.635	0,16%
Western Asia	32	1,10%	39.268	0,11%	24	1,81%	6.856	0,09%	8	0,51%	32.412	0,12%
Western Europe	96	3,31%	260.745	0,76%	77	5,82%	130.623	1,63%	19	1,20%	130.122	0,50%
#N/A	124	4,27%	58.304	0,17%	46	3,48%	35.469	0,44%	78	4,94%	22.835	0,09%
Total	**2.903**	**100%**	**34.146.668**	**100%**	**1.323**	**100%**	**8.007.132**	**100%**	**1.580**	**100%**	**26.139.536**	**100%**

Source: Crunchbase Data, own calculations

Looking at the distribution of funding across the regions it can be seen that both accelerator programs funding is highly concentrated within Northern America (Techstars: 90,14%, YC: 94,96%). While Techstars has a higher number of participants from outside Northern America the funding portion is smaller compared to YC.

The concentration of start-ups in Northern America is not unexpected as both programs have their origins in that region. YCs operation is solely based in Silicon Valley while Techstars has established a variety of international programs in recent years being reflected in the slightly large percentage of participants outside of Northern America.

Comparison with other start-ups

In order to confirm that start-ups participating in either accelerator program belong to the very top of start-ups, a second dataset was created comprising of 90.676 organizations. The summary of performance variables as well as operating status can be seen in Appendix 4. According to the data chosen, the start-ups participating in one of the chosen accelerator programs do not outperform the average start-up. However, as mentioned before Crunchbase does not provide a classification of an organization as a start-up. Thus, the dataset retrieved also covers not only start-ups but also spin-offs and well established and funded companies. In order to create a valid dataset, another database would have to be considered. Due to the limitations of this work this additional analysis was discarded.

5. Conclusion

The dataset available provides a comprehensive overview of each accelerator program and its participants. It points out several differences in the variables considered. Overall YC has better performance indicators and seems to provide a more successful program for its participants. The question is where this difference comes from. In order to answer this, both programs were analysed with respect to their philosophy and other factors which are summarised in Appendix

2 and 3. Based on the analysis performed by Miller & Bound (2011) as well as a blog post by Weiting Liu a YC and Techstars alumni it can be concluded that the accelerator programs have a significant difference in their approaches and their overall philosophy. While YC puts a large focus on achieving growth to gain a higher valuation, Techstars is more about educating the entrepreneur in various fields. YC is based in one single location while Techstars created a network all over the world believing in creating local ecosystems. YC connects participants with a large variety of successful founders and investors while Techstars is more actively involved in the local entrepreneurial ecosystem. Overall, it is concluded that part of YC higher performance indicators come from the larger focus on increasing valuations and connecting entrepreneurs to investors. Both accelerators are very successful and are leading in the field of acceleration. Each program has their benefits and may suit different star-ups better.

However, the essential question if accelerators add value at all and how or if the prestigious programs are only able to attract already successful start-ups could not be answered. Gonzalez-Uribe & Leatherbee (2016) provide some explanations to which extent accelerators add value. Due to the lack of a suitable comparison group it cannot be concluded that YC and Techstars add value.

In order to further analyse the impact of accelerator programs, more variables could be considered to further define start-up success and break down the impact an accelerator program has on these variables. To reliably evaluate the impact of the participation in an accelerator program further analysis could be based on time series data showing the development of start-ups participating in an accelerator program compared to start-ups that do not participate in an accelerator program. Essential for this analysis is a suitable comparison group. Furthermore, considering the development of a start-up after the participation in a program could further distinguish both programs.

List of References

Cohen, Susan, and Yael V. Hochberg. 2014. "Accelerating Startups: The Seed Accelerator Phenomenon". *SSRN Electronic Journal*. doi:10.2139/ssrn.2418000.

"Crunchbase Data". 2019. *Data.Crunchbase.Com*. https://data.crunchbase.com/docs.

Gonzalez-Uribe, Juanita, and Michael Leatherbee. 2017. "The Effects of Business Accelerators On Venture Performance: Evidence From Start-Up Chile". *The Review of Financial Studies* 31 (4): 1566-1603. doi:10.1093/rfs/hhx103.

Griffith, E. 2017. Conventional Wisdom Says 90% of Startups Fail. Data Says Otherwise. *Fortune*. Available at: http://fortune.com/2017/06/27/startup-advice-data-failure/.

Hallen, Benjamin L., Christopher B. Bingham, and Susan Cohen. 2014. "Do Accelerators Accelerate? A Study of Venture Accelerators As A Path To Success?". *Academy of Management Proceedings* 2014 (1): 12955. doi:10.5465/ambpp.2014.185.

Hathaway, Ian. 2016. "What Startup Accelerators Really Do". *Harvard Business Review*.

Hochberg, Yael V. 2016. "Accelerating Entrepreneurs and Ecosystems: The Seed Accelerator Model". *Innovation Policy and The Economy* 16: 25-51. doi:10.1086/684985.

Hoffman, David Lynn, and Nina Radojevich-Kelley. 2012. "Analysis of Accelerator Companies: An Exploratory Case Study Of Their Programs, Processes, And Early Results". *Small Business Institute Journal* 8 (2): 54-70.

Huggins, Robert, and Piers Thompson. 2015. "Entrepreneurship, Innovation and Regional Growth: A Network Theory". *Small Business Economics* 45 (1): 103-128. doi:10.1007/s11187-015-9643-3.

Liu, Weiting. 2016. "Startup Accelerator Comparison: Y Combinator VS Techstars". Blog. *Freecodecamp*. https://medium.freecodecamp.org/startup-accelerator-comparison-y-combinator-vs-techstars-b4080d0c93c8.

Mahmoud-Jouini, Sihem Ben, Corentin Duvert, and Mathilde Esquirol. 2018. "Key Factors In Building A Corporate Accelerator Capability". *Research-Technology Management* 61 (4): 26-34. doi:10.1080/08956308.2018.1471274.

Marmer, Max, Bjoern Lasse Hermann, Ertan Dogrultan, and Ron Berman. 2011. "Startup Genome Report Extra on Premature Scaling: A Deep Dive into Why Most High Growth Startups Fail". *Startup Genome*.

Miller, Paul, and Kirsten Bound. 2011. "The Startup Factories: The Rise Of Accelerator Programmes To Support New Technology Ventures". *NESTA*.

Pauwels, Charlotte, Bart Clarysse, Mike Wright, and Jonas Van Hove. 2016. "Understanding A New Generation Incubation Model: The Accelerator". *Technovation* 50-51: 13-24. doi:10.1016/j.technovation.2015.09.003.

"Techstars". 2019. *Techstars*. https://www.techstars.com/.

"Y Combinator".2019. *Ycombinator.com.* https://www.ycombinator.com/.

Appendix

Appendix 1: Python Code used to extract data from Crunchbase API

```
# -*- coding: utf-8 -*-
"""
Created on Tue Nov 13 17:01:29 2018

@author: chris
"""
import requests as r
import pandas as pd

Location = r"C:\Users\chris\Desktop\Work Project\Data\uuid_accelerator_companys.csv"
uuid = pd.read_csv(Location, header=None)
length = len(uuid.index)
rank_list = list()
#uuid_list = list()

for i in range(length):
    uuid_i = uuid.loc[i,0]
    #uuid_list.append(uuid.loc[i,0])
    json = r.get("https://api.crunchbase.com/v3.1/organizations/"+uuid_i+"?
user_key=USERKEY").json()
    try:
        rank = json["data"]["properties"]["rank"]
    except TypeError:
        rank = 0
    rank_list.append(rank)
    print (uuid_i)

export = pd.DataFrame(rank_list)
export.to_csv(r"C:\Users\chris\Desktop\Work Project\Data\export_uuid_1.csv")
```

Appendix 2: YC Overview – *Source: Y Combinator (https://www.ycombinator.com/about/)*

Founded: 2005

Location: Mountain View, California

Founders: Trevor Blackwell, Paul Graham, Jessica Livingstone and Robert Morris

Companies per class: approx. 30 in 2010, over 240 in 2 batches in 2018

Total startup alumni to date: 1.633 companies

Notable alumni: AirBnB, Dropbox, Stripe, Instacart, Reddit, Quora

YC has only one location and asks its participants to move to the San Francisco Bay Area for the duration of the program. However, founders are not required to show up to a designated office space.

There are a number of distinctive features in the YC program:

Dinners – The so-called Dinners are weekly meetings with an eminent person of the start-up world. The meeting starts around 6 pm providing a chance to network and present the weekly progress, followed by a simple dinner and an informal talk over dessert. These presentations are strictly off the record to encourage openness. The talks usually end in a Q&A after which the breaks into smaller informal groups like before the dinner.

Office hours – The second major aspect of YC, next to the events are individual conversations. Office hours can be booked through specially designed software allowing YC to evaluate the time spend with start-ups and the potential need for additional office hour slots. There is no limit to the number of office hours a start-up can book, and the frequency and topic vary largely depending on the stage of the start-up.

Demo Day – Demo Day at YC is a big deal for the participating start-ups and investors. The event has grown into a 3 day-long event with about 450 investors. The event is exclusive to selected investors and media representatives. The goal on Demo Day is for start-ups to present their product or service as convincingly as they can. During Demo Day, next to the presentations, founders and investors meet and network.

Fundraising - With the contacts made during the program and at Demo Day, start-ups usually have a large variety of great contacts to start fundraising. YC points out on their website that due to the known quality of YC start-ups and the ability to create price competition companies tend to get higher valuations and a higher quality of investors.

Other Events – Next to the Dinners and Demo Day there is a variety of other Events being Prototype Day, Rehearsal Day, Alumni Demo Day and others such conferences with YC alumni. Additionally, YC organizes a few social events. However, it is YCs belief that the social aspect is not a primary part of the program and that a true community organizes their own events.

Alumni – With 1.633 start-ups funded there is a large network of founders in a variety of industries and stages. YC calls its alumni network the most powerful network in the start-up world.

Philosophy - YC states that the overall goal is to help start-ups to take off. Start-ups arrive at all different stages and thus have different goals and needs. YC creates an atmosphere that is all about the start-up and thus usually allowing founders to be highly productive in the program. At YC it is all about focusing on building a product and talking to users. YC itself does not take board seats or other powers investors usually take. The accelerator is about giving advice while offering independence.

Appendix 3: Techstars Overview – *Source: Miller & Bound (2011), Techstars (https://www.techstars.com), Liu (2016)*

Founded: 2007

Location: 43 programs around the world

Founders: David Cohen, David Brown, Brad Feld and Jared Polis

Companies per class: around 10 per program

Total companies funded to date: 1.390

Notable alumni: SendGrid, PillPack, Graphicly, DigitalOcean, DataRobot

The Techstars program differs from YCs approach. Techstars has several programs around the world and differences in their program and philosophy. Techstars philosophy is to open source the accelerator model and encourage others to start accelerators and join the Techstars Network. A lot of the Techstars programs have come from a local investor approaching Techstars. Miller

& Bound (2011) explain that Cohen thinks the ideal combination to make a program work is one operator and one networker to connect the program to the local investment community.

The program lasts for 3 months, for which the companies are expected to move to the Techstars office space and completely focus on their projects. The Techstars alumni Weiting Liu describes several features in a blog post. He explains that Techstars offers classes, seminars and workshops covering different topics daily. Miller & Bound (2011) additionally point out that mentoring is an essential part of the Techstars approach. The first month of the program largely consists of meeting experienced tech entrepreneurs and investors to receive feedback on their business.

Furthermore, Liu describes that at the beginning of the program founders are urged to understand customers deeply and to make sure the start-up is building a product that people want. Liu describes the program structure as follows:

- Month 1: customer development
- Month 2: product development and gaining traction
- Month 3: practising the pitch to investors and for Demo Day

This structure puts a large focus on the pitch itself. When leaving Techstars founders will have performed their pitch several times, practising their presentation over a longer time period.

The Demo Day is an essential part of the program. However, compared to YC it plays a less direct role in terms of fundraising. The event itself is much more open for the community in the local area.

Techstars also has a strong alumni network around the globe. The network is concentrated in the cities where the programs are based, and each offers a small ecosystem. Liu explains that

this is beneficial as each entrepreneurial hub offers an already existing network that one can easily access.

Liu points out that Techstars vision is all about fostering local entrepreneurial ecosystems which represents Brad Feld's beliefs and is also topic of his *Boulder Thesis* as well as his book *Startup Communities: Building an Entrepreneurial Ecosystem in Your City*.

Appendix 4: Summary of Second Dataset

Table 1: Performance Variables

Age	Count	Average No. of Investment Rounds	SD	Average Funding in USD	SD
0-1	759	1,15	0,47	2.321.712	9.212.882
1-3	9826	1,41	0,81	7.002.859	71.560.560
3-5	19870	1,70	1,17	12.032.946	172.947.226
5-10	42590	1,97	1,52	18.582.778	225.746.801
10-15	17631	2,24	2,00	30.459.890	154.557.477
all	90676	1,89	1,51	18.347.883	190.032.826

Table 2: Percentage of organizations in different status of the total number in the age group

Age	Operating	Acquired	Closed	IPO
0-1	98,81%	0,66%	0,53%	0,00%
1-3	97,94%	0,99%	0,97%	0,10%
3-5	94,34%	2,60%	2,76%	0,31%
5-10	84,05%	7,87%	6,92%	1,16%
10-15	68,04%	17,24%	10,54%	4,24%
all	84,81%	7,73%	6,01%	1,45%